

Abstract of the Disclosure

A method for forming carbon nanotube field effect transistors, arrays of carbon nanotube field effect transistors, and device structures and arrays of device structures formed by the methods. The methods include forming a stacked structure including a gate electrode layer and catalyst pads each coupled electrically with a source/drain contact. The gate electrode layer is divided into multiple gate electrodes and at least one semiconducting carbon nanotube is synthesized by a chemical vapor deposition process on each of the catalyst pads. The completed device structure includes a gate electrode with a sidewall covered by a gate dielectric and at least one semiconducting carbon nanotube adjacent to the sidewall of the gate electrode. Source/drain contacts are electrically coupled with opposite ends of the semiconducting carbon nanotube to complete the device structure. Multiple device structures may be configured either as a memory circuit or as a logic circuit.